Differences in Resident Case-Mix Between Medicare and Non-Medicare Nursing Home Residents

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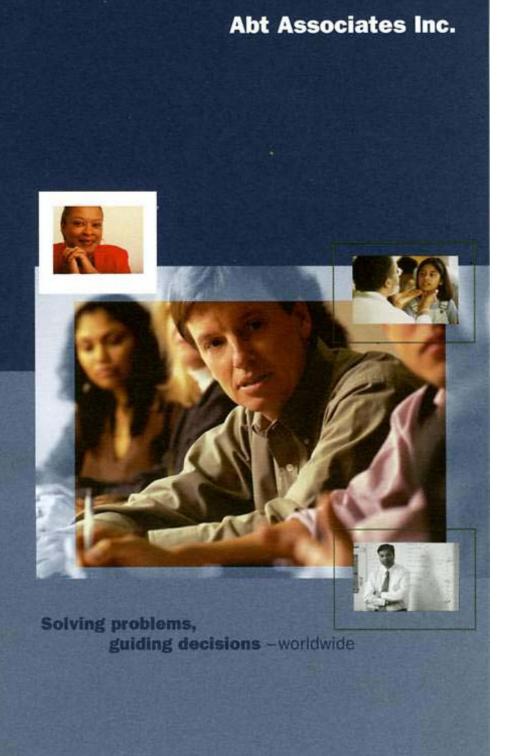
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A report by staff from Abt Associates for the Medicare Payment Advisory Commission

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October 2009

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Final Report

October 2009

Overview

The purpose of the analyses described in this report is to examine differences in average case-mix levels between Medicare and non-Medicare nursing home residents. We used the Minimum Data Set (MDS) to determine resident case-mix and payment source. Case-mix classification was based on the 53-group Resource Utilization Groups Version III (RUG-III) classification system that is used for the Medicare Skilled Nursing Facility Prospective Payment System.

Data Source

To perform the analysis, we used Minimum Data Set (MDS) assessments for calendar years 2007 and 2008. We used the Nursing Home Resident Profile Tables, an extract of the MDS data that includes information about active nursing home residents. The Resident Profile Tables, which are updated quarterly, contain one record for each active nursing home resident in each quarter. We obtained Nursing Home Resident Profile Table data for all four quarters in both 2007 and 2008.

In the Resident Profile Tables, information from MDS assessments for each active nursing home resident is consolidated to create a profile of the most recent quarterly information for the resident. This information can represent a composite of items taken from the most recent comprehensive, full, quarterly, PPS, and admission MDS assessments, with the intent of creating a profile with the most recent information for active nursing home residents. For residents who have more than one MDS assessment in a quarter, the information (including the RUG-III classification) is based on the most recent assessment, with information from prior assessments used, as needed, to impute for items that are missing on the most recent assessment.

Because of the methodology used to construct the Resident Profile Tables, not all MDS assessments for Medicare residents were included in our analyses. For example, for a resident that has a 5, 14, and 30-day assessment in a calendar quarter, only the 30-day assessment is included in the Resident Profile Tables, since it was the most recent one in the quarter. As a result, the methodology used to construct the Resident Profile Tables gives a more representative snapshot of the average case-mix of Medicare residents than would an analysis that included all MDS assessments. For example, an analysis that included all MDS assessments would include a higher proportion of 5-day assessments (since all Medicare residents have a 5-day assessment) than analysis conducted using the Resident Profile Tables. Using the Resident Profile Tables, 5-day assessments are only included for residents that did not have any other assessments in the quarter (i.e., either because they were discharged prior to the 14-day assessment or because their nursing home admission occurred late in the quarter).

Methods

To perform this analysis, we need information on resident case-mix and payment source.

Resident Case-Mix

The RUG-III system is used for classifying nursing home residents into homogenous groups according to common health characteristics and the amount and types of resources they use. We used

the 53-group version of the RUG-III, using the RUG-III group assignment included in the Resident Profile Table data.[1]

RUG-III classification was based on the rollup record RUG-III group code that was included in the Nursing Home Resident Profile Tables. This method assigns residents to a RUG-III group using the most recent assessment available for each resident, combining data across multiple assessments to assign a resident to a RUG-III group. For example, if the most recent assessment was a quarterly assessment that did not include all the items required to group residents into a RUG-III group, then this information is imputed based on the most recent full assessment for the resident.

Each RUG-III group has an associated nursing and therapy case-mix component

- *Nursing component:* The nursing component of the payment rate is intended to cover the costs of nursing services, social services, and non-therapy ancillary costs (i.e., prescription drugs, respiratory therapy, equipment and supplies). CMS assigns each RUG-III group a nursing index score based on the amount of staff time (weighted by salary levels) associated with caring for residents classified to that group. The nursing weight includes both resident specific time spent daily on behalf of each patient by RNs, LPNs, and nurses aides and other non-resident specific time spent on other necessary functions such as staff education, administrative duties, and other tasks.

- *Therapy case-mix component:* The therapy case-mix component is a measure of the amount of rehabilitation therapy time associated with caring for residents in each case-mix group. The therapy index includes costs associated with occupational, physical, and speech therapy.

We obtained the most recent nursing and therapy index values from the August 4, 2005 Federal Register (Table 4A on page 45038 – 45039). We present these index values in Appendix B.

Payment Source

We identified three groups of assessments in the MDS:

- *Medicare assessments:* We identified Medicare assessments based on MDS item A8b (codes for assessments required for Medicare PPS) and MDS item A7b (current payment sources for nursing home stay is Medicare per Diem). To be classified as Medicare, the assessment had to be a Medicare-required assessment and Medicare had to be listed as a payment source. That is, a resident must have both: (1) MDS item A8b equal to 1, 2, 3, 4, 5, 7, or 8 (the codes for Medicare required assessments) AND (2) A7b equal to 1.

- *Non-Medicare assessments:* These were all assessments that were not Medicare-required and for which Medicare per diem was not indicated as a payment source (.i.e., assessments where: (1) A8b did not equal 1, 2, 3, 4, 5, 7, or 8 AND (2) A7b did not equal 1.

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[1] While Medicare uses the 53-group version of RUG-III in its prospective payment system, the majority of states that use RUG-III use the 34 group version of the system that was developed specifically for Medicaid populations. Appendix A provides a listing of states using RUG-III case-mix adjustment and the type of RUG-III system used

- *Medicaid assessments:* Identification of Medicaid assessments is less reliable than identification of Medicare assessments. We used MDS item A7a (current payment source for a nursing home stay was Medicaid per Diem) and MDS item A8b. To be classified as Medicaid: (1) A7a must equal 1 AND (2) A8b cannot equal 1, 2, 3, 4, 5, 7, or 8.

Note that this method results in assessments that have missing or conflicting payment source information as not being classified as either Medicare or non-Medicare. These assessments were excluded from our analyses. Due to missing or inconsistent payment source information, we excluded 1,055,249 records from 2007 (about 19 percent of the total) and 1,063,237 records from 2008 (19.3 percent of the total). These exclusions include records with no payment source information listed and also records with inconsistent information (e.g., assessments that were reported as Medicare required assessments for which Medicare was not indicated as the payment source and non-Medicare required assessments for which Medicare was indicated as the payment source). Based on average case-mix levels, our analysis suggested that assessments with this type of conflicting information included a combination of Medicare and non-Medicare assessments. Given that case-mix levels tend to be higher for Medicare residents, including them in the non-Medicare group would tend to bias upward our estimates of estimates of non-Medicare case-mix, while counting them as Medicare assessments would tend to bias downward our estimates of Medicare case-mix.

Because of limitations in the accuracy of the payment source information, we are more confident in comparisons of Medicare and non-Medicare case-mix than we are of the Medicare-Medicaid comparisons.

Sample Selection

We included all 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands in our analyses, but performed separate analyses on the subset of states that use a RUG-III system for their Medicaid payment system. Currently 25 states use versions of the RUG-III system for nursing home payments.[1] Since the MDS is used for payment purposes in these states, the MDS data for non-Medicare assessments may be more accurate than in states that do not use the MDS for payment.

As shown in Appendix A, states that use a RUG-III system for Medicaid payment include: Colorado, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Minnesota, Mississippi, Montana, Nevada, New Hampshire, North Carolina, North Dakota, Ohio, Pennsylvania, Texas, Utah, Vermont, Virginia, Washington, and West Virginia.

Sensitivity Analyses

We analyzed the consistency of Medicare and non-Medicare case-mix across states. Large differences in average case-mix may reflect MDS accuracy issues, and it may be appropriate to consider the sensitivity of results to the exclusion of these states. We will be providing MedPAC with a Microsoft Excel spreadsheet that has data for all states so that MedPAC will have flexibility in deciding which states to include in its analyses.

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[1] Source: Rudder C, Mollot RJ, Holt J, Mathuria B. "Modifying the Case-Mix Medicaid Nursing Home System to Encourage Quality, Access and Efficiency" New York: Long Term Care Community Coalition; 2009. p. 91 – 119. Available at http://www.nursinghome411.org/NursingHomeReimbursement.php. Accessed September 30, 2009.

Results

The sample included more than 4.5 million records in 2007 and 4.4 million records in 2008, almost half of which were from states that use a RUG-III system for Medicaid reimbursement (Table 1).   In both years, Medicare was the payment source for about 15 percent of records while Medicaid was identified as the payment source for approximately 62 percent of records. The proportion of Medicare and Medicaid assessments was almost identical in the subset of states that use RUG-III for Medicaid reimbursement.

Table 1
Number of MDS Assessments Included in Analyses, by Payment Source and Year

Payment Source	All States				States Using RUG-III for Medicaid Reimbursement			
	2007		2008		2007		2008	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Medicare	665,137	14.8%	665,159	15.0%	329,299	14.7%	329,620	14.9%
Non-Medicare	3,842,405	85.2%	3,775,463	85.0%	1,914,550	85.3%	1,878,160	85.1%
Total	4,507,542	100%	4,440,622	100%	2,243,849	100%	2,207,780	100%
Medicaid	2,783,478	61.8%	2,735,813	61.6%	1,383,388	61.7%	1,356,873	61.5%

Note: Medicaid assessments are also included in the non-Medicare category.

Source: Minimum Data Set, Resident Profile Table

Our analysis found that both nursing and therapy index values were higher for Medicare residents than for non-Medicare residents:

- In 2007, the average nursing index was 1.179 for Medicare assessments, 0.876 for non-Medicare assessments, and 0.865 for Medicaid assessments (Table 2). The 2008 values were very similar, with an average nursing index of 1.189 for Medicare assessments, 0.884 for non-Medicare assessments, and 0.872 for Medicaid assessments. There were only small differences in the average nursing index for the subset of states that use RUG-III for Medicaid reimbursement.

- As expected, the average therapy index was much higher for Medicare assessments. In 2007, the mean therapy index was 1.120 for Medicare assessments, compared to 0.129 for non-Medicare assessments, and 0.094 for Medicaid assessments. The average therapy index for Medicare assessments increased to 1.217 in 2008, and there were increases in the mean therapy index for non-Medicare and Medicaid assessments in 2008.

Table 2
Average Nursing and Therapy Index, by Payment and Year

Payment Source	All States				States Using RUG-III for Medicaid Reimbursement			
	2007		2008		2007		2008	
	Nursing Index	Therapy Index	Nursing Index	Therapy Index	Nursing Index	Therapy Index	Nursing Index	Therapy Index
Medicare	1.179	1.120	1.189	1.217	1.177	1.126	1.184	1.216
Non-Medicare	0.876	0.129	0.884	0.145	0.883	0.144	0.893	0.164
Medicaid	0.865	0.094	0.872	0.107	0.880	0.120	0.889	0.139

Note: Medicaid assessments are also included in the non-Medicare category.

Source: Minimum Data Set, Resident Profile Table

Using the results from Table 2, we calculated the ratio of non-Medicare to Medicare case-mix:

- Table 3 shows that across all states, the ratio of the Medicare to the non-Medicare nursing index was 1.346 in 2007 and 1.345 in 2008.   The ratio of the nursing index for Medicaid to Medicare assessments was 1.363 in 2007 and 1.364 in 2008. These ratios were slightly lower in the subset of RUG-III states.

- The ratio of the non-Medicare to Medicare therapy index was 8.682 in 2007 and 8.393 in 2008. The ratio of Medicaid to Medicare for the therapy index was 11.915 in 2007 and 11.374 in 2008.

- When adding the therapy index to the nursing index, the overall non-Medicare to Medicare case-mix index ratio was 2.288 in 2007 and 2.338 in 2008. The overall Medicaid to Medicare ratio was 2.397 in 2007 and 2.458 in 2008.

Table 3
Ratio of Non-Medicare to Medicare Case-mix

	All States		All RUG-III States	
	2007	**2008**	**2007**	**2008**
Nursing Index				
Ratio of Medicare to Non-Medicare	1.346	1.345	1.333	1.326
Ratio of Medicare to Medicaid	1.363	1.364	1.338	1.332
Therapy Index				
Ratio of Medicare to Non-Medicare	8.682	8.393	7.819	7.415
Ratio of Medicare to Medicaid	11.915	11.374	9.383	8.748
Sum of Nursing and Therapy Index				
Ratio of Medicare to Non-Medicare	2.288	2.338	2.242	2.271
Ratio of Medicare to Medicaid	2.397	2.458	2.303	2.335

Note: Medicaid assessments are also included in the non-Medicare category.

Source: Minimum Data Set, Resident Profile Table

Tables 4 through 7 contain nursing and therapy index values for individual states. In addition to these tables, we are providing this information to MedPAC in Microsoft Excel format to give maximum flexibility in determining how to account for state differences in Medicare and non-Medicare case-mix in its analyses.

These tables showed considerable across-state variation in both the nursing and therapy indices:

- In 2007, the average nursing index for Medicare patient ranged from 1.104 in Oklahoma to 1.238 in New Jersey (Table 4). For the nursing index in 2007, the Medicare to non-Medicare ratio ranged from a low of 1.213 in Pennsylvania to a high of 1.464 in Iowa (Table 4). For most states, there was little change in the average nursing index values between 2007 and 2008 (Table 6).

- There was some across-state variation in the therapy index. In 2007, the Medicare to non-Medicare ratio of the therapy index ranged from a low of 3.380 in Pennsylvania to a high of 20.361 in Montana (Table 5)[1]. Patterns for 2008 were consistent with those of 2007 (Table 7).

Because we have no "gold standard" to use for assessing the accuracy of state MDS assessments, it is not possible to determine the extent to which these across-state differences reflect MDS coding issues, or differences due to missing RUG-III information for quarterly assessments in some states, versus true differences in patient acuity across states.

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[1] Note that, while Puerto Rico had a higher ratio than Pennsylvania, the analytic sample for 2007 only included five non-Medicare assessments. For 2008, there was only one non-Medicare assessment for Puerto Rico included in our analyses.

Table 4
Nursing Index Values by State: 2007

State	N	Ratio		Average Nursing Index		
		Medicare to Non- Medicare	Medicare to Medicaid	Medicare	Not Medicare	Medicaid
Alabama	92,299	1.352	1.370	1.155	0.854	0.843
Alaska	2,416	1.369	1.384	1.246	0.910	0.900
Arizona	46,317	1.348	1.394	1.186	0.880	0.851
Arkansas	73,297	1.390	1.410	1.134	0.816	0.804
California	404,477	1.316	1.353	1.192	0.906	0.881
Colorado	64,293	1.353	1.388	1.162	0.859	0.837
Connecticut	107,430	1.349	1.372	1.114	0.826	0.812
Delaware	15,704	1.394	1.391	1.189	0.853	0.855
District of Columbia	10,103	1.349	1.360	1.163	0.862	0.855
Florida	279,793	1.336	1.382	1.201	0.899	0.869
Georgia	138,809	1.332	1.336	1.180	0.886	0.883
Hawaii	15,067	1.313	1.313	1.186	0.903	0.903
Idaho	17,765	1.275	1.287	1.163	0.912	0.904
Illinois	300,915	1.452	1.478	1.159	0.798	0.784
Indiana	156,754	1.269	1.263	1.151	0.907	0.911
Iowa	103,006	1.464	1.431	1.205	0.823	0.842
Kansas	76,214	1.396	1.395	1.145	0.820	0.821
Kentucky	91,184	1.265	1.259	1.202	0.950	0.955
Louisiana	101,870	1.366	1.364	1.143	0.837	0.838
Maine	25,275	1.279	1.273	1.175	0.919	0.923
Maryland	98,423	1.380	1.398	1.216	0.881	0.870
Massachusetts	170,129	1.361	1.397	1.183	0.869	0.847
Michigan	160,969	1.348	1.375	1.165	0.864	0.847
Minnesota	123,221	1.394	1.394	1.182	0.848	0.848
Mississippi	63,478	1.294	1.294	1.118	0.864	0.864
Missouri	150,616	1.435	1.456	1.155	0.805	0.793
Montana	20,595	1.417	1.417	1.156	0.816	0.816
Nebraska	51,386	1.380	1.360	1.174	0.851	0.863
Nevada	18,139	1.295	1.356	1.191	0.920	0.878
New Hampshire	26,886	1.329	1.329	1.142	0.859	0.859
New Jersey	174,995	1.430	1.472	1.238	0.866	0.841
New Mexico	24,492	1.362	1.396	1.166	0.856	0.835
New York	437,277	1.332	1.360	1.168	0.877	0.859
North Carolina	150,435	1.282	1.292	1.160	0.905	0.898
North Dakota	23,170	1.421	1.386	1.177	0.828	0.849
Ohio	309,708	1.280	1.295	1.225	0.957	0.946
Oklahoma	76,885	1.423	1.443	1.104	0.776	0.765
Oregon	31,666	1.355	1.407	1.211	0.894	0.861
Pennsylvania	307,483	1.213	1.229	1.214	1.001	0.988
Puerto Rico	736	1.307	---	1.231	0.942	---
Rhode Island	31,787	1.371	1.465	1.172	0.855	0.800
South Carolina	65,958	1.335	1.342	1.147	0.859	0.855
South Dakota	25,583	1.461	1.429	1.202	0.823	0.841
Tennessee	129,861	1.364	1.395	1.191	0.873	0.854
Texas	369,608	1.408	1.422	1.149	0.816	0.808

Table 4
Nursing Index Values by State: 2007

State	N	Ratio		Average Nursing Index		
		Medicare to Non- Medicare	Medicare to Medicaid	Medicare	Not Medicare	Medicaid
Utah	21,509	1.327	1.338	1.169	0.881	0.874
Vermont	11,706	1.303	1.297	1.171	0.899	0.903
Virgin Islands	140	1.145	1.152	0.926	0.809	0.804
Virginia	110,591	1.320	1.326	1.188	0.900	0.896
Washington	74,984	1.304	1.292	1.217	0.933	0.942
West Virginia	38,966	1.313	1.320	1.183	0.901	0.896
Wisconsin	128,824	1.404	1.411	1.185	0.844	0.840
Wyoming	9,597	1.373	1.374	1.120	0.816	0.815

Note: N = 5,562,791 MDS assessments for 2007 (including MDS assessments for which RUG-III groups could not be determined)

Nursing index values based on RUG-III nursing and therapy values from the Federal Register, August 4, 2005
(pg. 45037 - 45038) (See Appendix B)

Source: Minimum Data Set, Resident Profile Table

Table 5
Therapy Index Values by State: 2007

State	N	Ratio			Average Therapy Index		
		Medicare to Non-Medicare	Medicare to Medicaid		Medicare	Non-Medicare	Medicaid
Alabama	92,299	11.386	19.167	11.386	1.150	0.101	0.060
Alaska	2,416	10.667	19.810	10.667	0.416	0.039	0.021
Arizona	46,317	10.766	20.211	10.766	1.152	0.107	0.057
Arkansas	73,297	10.323	19.654	10.323	1.022	0.099	0.052
California	404,477	8.468	15.920	8.468	1.194	0.141	0.075
Colorado	64,293	12.382	22.158	12.382	1.263	0.102	0.057
Connecticut	107,430	11.831	19.091	11.831	0.840	0.071	0.044
Delaware	15,704	17.746	19.755	17.746	1.047	0.059	0.053
District of Columbia	10,103	8.821	10.019	8.821	1.032	0.117	0.103
Florida	279,793	9.075	15.351	9.075	1.443	0.159	0.094
Georgia	138,809	9.352	11.159	9.352	0.982	0.105	0.088
Hawaii	15,067	14.465	27.757	14.465	1.027	0.071	0.037
Idaho	17,765	9.771	12.955	9.771	1.153	0.118	0.089
Illinois	300,915	14.309	18.694	14.309	1.159	0.081	0.062
Indiana	156,754	7.029	8.092	7.029	1.230	0.175	0.152
Iowa	103,006	16.961	23.378	16.961	0.865	0.051	0.037
Kansas	76,214	13.410	16.603	13.410	1.046	0.078	0.063
Kentucky	91,184	6.180	6.772	6.180	1.131	0.183	0.167
Louisiana	101,870	7.832	8.682	7.832	1.120	0.143	0.129
Maine	25,275	16.026	17.380	16.026	1.234	0.077	0.071
Maryland	98,423	12.989	20.926	12.989	1.130	0.087	0.054
Massachusetts	170,129	9.381	17.377	9.381	1.060	0.113	0.061
Michigan	160,969	11.275	20.148	11.275	1.229	0.109	0.061
Minnesota	123,221	11.210	16.509	11.210	0.908	0.081	0.055
Mississippi	63,478	7.880	8.504	7.880	1.182	0.150	0.139
Missouri	150,616	10.240	15.896	10.240	1.065	0.104	0.067
Montana	20,595	20.361	26.179	20.361	0.733	0.036	0.028
Nebraska	51,386	14.815	19.260	14.815	0.963	0.065	0.050
Nevada	18,139	8.748	16.278	8.748	1.286	0.147	0.079
New Hampshire	26,886	11.198	13.272	11.198	1.075	0.096	0.081
New Jersey	174,995	7.884	14.037	7.884	1.151	0.146	0.082
New Mexico	24,492	10.667	21.961	10.667	1.120	0.105	0.051
New York	437,277	7.009	11.174	7.009	0.771	0.110	0.069
North Carolina	150,435	7.304	9.566	7.304	1.081	0.148	0.113
North Dakota	23,170	18.914	22.828	18.914	0.662	0.035	0.029
Ohio	309,708	5.730	6.769	5.730	1.232	0.215	0.182
Oklahoma	76,885	13.612	23.612	13.612	1.157	0.085	0.049
Oregon	31,666	8.038	20.961	8.038	1.069	0.133	0.051
Pennsylvania	307,483	3.380	3.828	3.380	1.068	0.316	0.279
Puerto Rico	736	0.560	---	0.560	0.740	1.322	---
Rhode Island	31,787	7.087	20.057	7.087	1.063	0.150	0.053
South Carolina	65,958	16.718	23.740	16.718	1.187	0.071	0.050
South Dakota	25,583	17.531	16.519	17.531	0.859	0.049	0.052
Tennessee	129,861	10.757	19.508	10.757	1.151	0.107	0.059
Texas	369,608	11.248	17.116	11.248	1.181	0.105	0.069

Table 5
Therapy Index Values by State: 2007

State	N	Ratio Medicare to Non-Medicare	Medicare to Medicaid		Average Therapy Index Medicare	Non-Medicare	Medicaid
Utah	21,509	14.196	20.864	14.196	1.377	0.097	0.066
Vermont	11,706	9.924	11.701	9.924	0.784	0.079	0.067
Virgin Islands	140	13.854	---	13.854	0.665	0.048	0.000
Virginia	110,591	10.099	13.035	10.099	1.121	0.111	0.086
Washington	74,984	9.790	9.519	9.790	1.028	0.105	0.108
West Virginia	38,966	7.012	8.040	7.012	1.206	0.172	0.150
Wisconsin	128,824	10.882	13.875	10.882	1.110	0.102	0.080
Wyoming	9,597	18.917	25.222	18.917	0.908	0.048	0.036

Note: N = 5,562,791 MDS assessments for 2007 (including MDS assessments for which RUG-III groups could not be determined)

Nursing index values based on RUG-III nursing and therapy values from the Federal Register, August 4, 2005
(pg. 45037 - 45038) (See Appendix B)

Source: Minimum Data Set, Resident Profile Table

Table 6
Nursing Index Values by State: 2008

State	N	Ratio		Average Nursing Index		
		Medicare to Non- Medicare	Medicare to Medicaid	Medicare	Not Medicare	Medicaid
Alabama	91,795	1.360	1.381	1.170	0.860	0.847
Alaska	2,412	1.329	1.345	1.205	0.907	0.896
Arizona	46,197	1.332	1.389	1.200	0.901	0.864
Arkansas	73,204	1.417	1.440	1.159	0.818	0.805
California	401,530	1.325	1.362	1.212	0.915	0.890
Colorado	63,231	1.353	1.394	1.174	0.868	0.842
Connecticut	104,839	1.372	1.401	1.143	0.833	0.816
Delaware	16,339	1.383	1.379	1.180	0.853	0.856
District of Columbia	9,648	1.367	1.364	1.228	0.898	0.900
Florida	277,187	1.338	1.386	1.218	0.910	0.879
Georgia	137,642	1.315	1.321	1.186	0.902	0.898
Hawaii	15,081	1.317	1.323	1.197	0.909	0.905
Idaho	17,629	1.285	1.291	1.185	0.922	0.918
Illinois	296,840	1.460	1.486	1.171	0.802	0.788
Indiana	155,708	1.265	1.257	1.164	0.920	0.926
Iowa	101,895	1.459	1.427	1.207	0.827	0.846
Kansas	74,464	1.383	1.385	1.144	0.827	0.826
Kentucky	90,727	1.267	1.262	1.206	0.952	0.956
Louisiana	100,559	1.350	1.350	1.137	0.842	0.842
Maine	24,813	1.276	1.274	1.178	0.923	0.925
Maryland	96,793	1.387	1.404	1.230	0.887	0.876
Massachusetts	167,079	1.363	1.402	1.193	0.875	0.851
Michigan	159,023	1.344	1.375	1.173	0.873	0.853
Minnesota	119,284	1.398	1.402	1.197	0.856	0.854
Mississippi	63,434	1.287	1.289	1.125	0.874	0.873
Missouri	149,138	1.425	1.450	1.151	0.808	0.794
Montana	20,159	1.418	1.418	1.163	0.820	0.820
Nebraska	49,918	1.378	1.361	1.185	0.860	0.871
Nevada	18,343	1.293	1.364	1.214	0.939	0.890
New Hampshire	26,746	1.342	1.342	1.154	0.860	0.860
New Jersey	174,996	1.449	1.491	1.261	0.870	0.846
New Mexico	23,109	1.370	1.407	1.178	0.860	0.837
New York	430,389	1.333	1.364	1.177	0.883	0.863
North Carolina	149,092	1.272	1.281	1.164	0.915	0.909
North Dakota	22,882	1.443	1.400	1.186	0.822	0.847
Ohio	306,685	1.282	1.300	1.235	0.963	0.950
Oklahoma	76,148	1.435	1.456	1.115	0.777	0.766
Oregon	31,274	1.340	1.386	1.206	0.900	0.870
Pennsylvania	305,437	1.204	1.215	1.220	1.013	1.004
Puerto Rico	707	1.161	---	1.277	1.100	---
Rhode Island	30,935	1.391	1.485	1.182	0.850	0.796
South Carolina	66,309	1.335	1.336	1.148	0.860	0.859
South Dakota	25,400	1.455	1.428	1.208	0.830	0.846
Tennessee	127,329	1.367	1.399	1.202	0.879	0.859
Texas	371,092	1.393	1.403	1.149	0.825	0.819

Table 6
Nursing Index Values by State: 2008

State	N	Ratio		Average Nursing Index		
		Medicare to Non- Medicare	Medicare to Medicaid	Medicare	Not Medicare	Medicaid
Utah	21,009	1.301	1.317	1.177	0.905	0.894
Vermont	11,741	1.316	1.306	1.192	0.906	0.913
Virgin Islands	136	1.397	1.362	1.148	0.822	0.843
Virginia	110,352	1.329	1.334	1.203	0.905	0.902
Washington	72,568	1.296	1.289	1.226	0.946	0.951
West Virginia	38,524	1.312	1.325	1.207	0.920	0.911
Wisconsin	126,583	1.391	1.396	1.195	0.859	0.856
Wyoming	9,505	1.367	1.360	1.136	0.831	0.835

Note: N = 5,503,859 MDS assessments for 2008 (including MDS assessments for which RUG-III groups could not be determined)

Nursing index values based on RUG-III nursing and therapy values from the Federal Register, August 4, 2005
(pg. 45037 - 45038) (See Appendix B)

Source: Minimum Data Set, Resident Profile Table

Table 7
Therapy Index Values by State: 2008

State	N	Ratio		Average Therapy Index		
		Medicare to Non- Medicare	Medicare to Medicaid	Medicare	Not Medicare	Medicaid
Alabama	91,795	11.491	19.092	1.241	0.108	0.065
Alaska	2,412	13.150	21.040	0.526	0.040	0.025
Arizona	46,197	10.677	21.355	1.324	0.124	0.062
Arkansas	73,204	11.083	20.288	1.197	0.108	0.059
California	401,530	8.709	15.843	1.315	0.151	0.083
Colorado	63,231	11.830	22.458	1.325	0.112	0.059
Connecticut	104,839	11.646	18.776	0.920	0.079	0.049
Delaware	16,339	16.096	18.817	1.336	0.083	0.071
District of Columbia	9,648	8.000	8.384	1.048	0.131	0.125
Florida	277,187	8.549	14.300	1.573	0.184	0.110
Georgia	137,642	8.872	10.174	1.109	0.125	0.109
Hawaii	15,081	17.631	33.706	1.146	0.065	0.034
Idaho	17,629	9.000	12.320	1.269	0.141	0.103
Illinois	296,840	14.628	18.500	1.258	0.086	0.068
Indiana	155,708	6.483	7.343	1.329	0.205	0.181
Iowa	101,895	15.466	22.425	0.897	0.058	0.040
Kansas	74,464	12.275	15.514	1.117	0.091	0.072
Kentucky	90,727	6.010	6.575	1.190	0.198	0.181
Louisiana	100,559	7.427	8.270	1.166	0.157	0.141
Maine	24,813	13.186	14.534	1.279	0.097	0.088
Maryland	96,793	12.431	20.452	1.268	0.102	0.062
Massachusetts	167,079	9.333	16.882	1.148	0.123	0.068
Michigan	159,023	11.239	19.924	1.315	0.117	0.066
Minnesota	119,284	11.046	16.017	0.961	0.087	0.060
Mississippi	63,434	7.174	8.172	1.234	0.172	0.151
Missouri	149,138	9.842	15.583	1.122	0.114	0.072
Montana	20,159	22.027	31.346	0.815	0.037	0.026
Nebraska	49,918	13.076	16.934	1.033	0.079	0.061
Nevada	18,343	7.484	14.196	1.377	0.184	0.097
New Hampshire	26,746	12.130	14.975	1.213	0.100	0.081
New Jersey	174,996	8.361	14.562	1.296	0.155	0.089
New Mexico	23,109	11.700	21.450	1.287	0.110	0.060
New York	430,389	7.246	11.554	0.855	0.118	0.074
North Carolina	149,092	6.801	9.016	1.163	0.171	0.129
North Dakota	22,882	19.382	23.536	0.659	0.034	0.028
Ohio	306,685	5.603	6.729	1.339	0.239	0.199
Oklahoma	76,148	12.923	21.000	1.176	0.091	0.056
Oregon	31,274	8.596	22.922	1.169	0.136	0.051
Pennsylvania	305,437	3.306	3.617	1.190	0.360	0.329
Puerto Rico	707	---	---	0.818	0.000	---
Rhode Island	30,935	7.474	20.554	1.151	0.154	0.056
South Carolina	66,309	16.733	23.241	1.255	0.075	0.054
South Dakota	25,400	16.661	15.295	0.933	0.056	0.061
Tennessee	127,329	10.530	18.667	1.232	0.117	0.066
Texas	371,092	10.790	15.286	1.284	0.119	0.084

Table 7
Therapy Index Values by State: 2008

State	N	Ratio		Average Therapy Index		
		Medicare to Non- Medicare	Medicare to Medicaid	Medicare	Not Medicare	Medicaid
Utah	21,009	12.812	19.218	1.499	0.117	0.078
Vermont	11,741	8.779	9.477	0.834	0.095	0.088
Virgin Islands	136	102.900	---	1.029	0.010	0.000
Virginia	110,352	9.883	13.033	1.186	0.120	0.091
Washington	72,568	9.121	9.121	1.131	0.124	0.124
West Virginia	38,524	5.840	7.115	1.238	0.212	0.174
Wisconsin	126,583	9.447	11.737	1.162	0.123	0.099
Wyoming	9,505	18.333	21.250	0.935	0.051	0.044

Note: N = 5,503,859 MDS assessments for 2008 (including MDS assessments for which RUG-III groups could not be determined)

Nursing index values based on RUG-III nursing and therapy values from the Federal Register, August 4, 2005
(pg. 45037 - 45038) (See Appendix B)

Source: Minimum Data Set, Resident Profile Table

Appendix A
States Using RUG-III Case-mix Adjustment for Nursing Home Payments

State	RUG-III Type
Colorado	RUG-III 34 Groups Index Maximizing
Georgia	RUG-III 34 Groups
Idaho	RUG-III 34 Groups Index Maximizing
Illinois	RUG-III 34 Groups
Indiana	RUG-III 34 Groups Index Maximizing
Iowa	RUG-III 34 Groups Index Maximizing
Kansas	RUG-III 34 Groups Index Maximizing
Kentucky	RUG-III 34 Groups Index Maximizing
Louisiana	RUG-III 34 Groups Index Maximizing
Maine	RUG-III 44 Groups Index Maximizing
Minnesota	RUG-III 34 Groups
Mississippi	RUG-III 34 Groups Index Maximizing
Montana	RUG-III 34 Groups Index Maximizing
Nevada	RUG-III 34 Groups Index Maximizing
New Hampshire	RUG-III 34 Groups Index Maximizing
North Carolina	RUG-III 34 Groups
North Dakota	RUG-III 34 Groups Index Maximizing
Ohio	RUG-III 44 Groups Hierarchical
Pennsylvania	RUG-III 44 Groups
Texas	RUG-III 34 Groups Index Maximizing
Utah	RUG-III 34 Groups
Vermont	RUG-III 44 Groups Index Maximizing
Virginia	RUG-III 34 Groups Index Maximizing
Washington	RUG-III 44 Groups Hierarchical Index Maximizing
West Virginia	29 Case Mix Categories Based off of RUG-III Categories

Note: While the RUG-III system is a hierarchical one, there are some instances where the case-mix index is higher for a case-mix group that is lower in the RUG-III hierarchy. For example, the case-mix index (CMI) for some of the extensive services groups is higher than the CMI for some rehabilitation groups. In an index maximizing system, assignment to case mix groups is based on the case-mix group with the highest case-mix index for which the resident qualifies. Classification in a hierarchical system, is based on the first case-mix group for which a resident qualifies. The Medicare PPS uses an index maximizing approach.

Source: Rudder C, Mollot RJ, Holt J, Mathuria B. "Modifying the Case-Mix Medicaid Nursing Home System to Encourage Quality, Access and Efficiency" New York: Long Term Care Community Coalition; 2009. p. 91 – 119

Appendix B
Nursing and Therapy Index Values for the RUG-III System

RUG-III Code	Index Values	
	Nursing index	**Therapy Index**
BA1	0.52	0.00
BA2	0.60	0.00
BB1	0.69	0.00
BB2	0.73	0.00
CA1	0.80	0.00
CA2	0.90	0.00
CB1	0.91	0.00
CB2	0.98	0.00
CC1	1.06	0.00
CC2	1.22	0.00
IA1	0.56	0.00
IA2	0.61	0.00
IB1	0.72	0.00
IB2	0.74	0.00
PA1	0.50	0.00
PA2	0.53	0.00
PB1	0.54	0.00
PB2	0.55	0.00
PC1	0.69	0.00
PC2	0.71	0.00
PD1	0.76	0.00
PD2	0.78	0.00
PE1	0.82	0.00
PE2	0.85	0.00
RHA	0.94	0.94
RHB	1.11	0.94
RHC	1.22	0.94
RHL	1.37	0.94
RHX	1.42	0.94
RLA	0.85	0.43
RLB	1.14	0.43
RLX	1.31	0.43
RMA	1.04	0.77
RMB	1.09	0.77
RMC	1.15	0.77
RML	1.68	0.77
RMX	1.93	0.77
RUA	0.84	2.25
RUB	0.99	2.25
RUC	1.28	2.25
RUL	1.40	2.25
RUX	1.90	2.25
RVA	0.82	1.41

Appendix B
Nursing and Therapy Index Values for the RUG-III System

RUG-III Code	Index Values	
	Nursing index	**Therapy Index**
RVB	1.09	1.41
RVC	1.23	1.41
RVL	1.33	1.41
RVX	1.54	1.41
SE1	1.26	0.00
SE2	1.49	0.00
SE3	1.86	0.00
SSA	1.10	0.00
SSB	1.13	0.00
SSC	1.23	0.00

Source: Federal Register, August 4, 2005 (pg. 45037 - 45038)